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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,192	09/17/2003	Ching-Pang Lee	GE120338	3884
29827	7590	12/13/2004	EXAMINER	
FRANCIS L. CONTE, ESQ. 6 PURITAN AVENUE SWAMPSCOTT, MA 01907			KERSHTEYN, IGOR	
			ART UNIT	PAPER NUMBER
			3745	

DATE MAILED: 12/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/664,192	LEE ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Igor Kershteyn	3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,9-19 and 23 is/are rejected.
- 7) ☒ Claim(s) 7,8,20-22 and 24-27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>09/17/2003</u> . | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Claim Objections***

Claim 9 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 9 recites "said channels are disposed in said substrate below said bond coat" which fails to further limit the subject matter of a previous claim 3.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 11 is rejected under 35 U.S.C. 102(a) as being anticipated by Lee et al. (6,617,003).

In figures 1-7, Lee et al. teach a gas turbine engine wall comprising: a metal substrate 4 having front 13 and back (not shown) surfaces, and an aperture inlet 6 extending therethrough, a thermal barrier coating 24 bonded atop said front surface 13;

and a network of flow channels 20 laminated between said substrate 4 and coating 24 for carrying an air coolant therebetween.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sloop et al. (5,375,973) in view of Lee et al. (6,617,003).

Sloop et al., in figure 1-8, teach a turbine shroud 19 comprising: an arcuate substrate wall having front (not numbered) and back surface 40, forward 21 and aft 22 hooks extending from said back surface 40, and a plurality of aperture inlets 41,42 extending therethrough; a thermal barrier coating 37 bonded to said wall front surface.

Sloop et al. don't teach flow channels extending parallel between wall and a coating.

Lee et al. in figures 1-7, teach a turbine wall having flow channels 20 extending parallel between wall 4 and a coating 24.

Since Sloop et al. and Lee et al. are analogous art because they are from the same field of endeavor, that is the gas turbine cooling art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the cooling arrangement of Sloop et al. with the flow channels extending parallel between

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wall and a coating as taught by Lee et al. for the purpose of allowing turbine engine shroud running at higher operating temperatures.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sloop et al. (5,375,973) as modified by Lee et al. (6,617,003), as applied to claim 1 above, further in view of Gupta et al. (5,941,686).

Sloop et al. as modified by Lee et al., teach all the claimed subject matter except that they don't teach a plurality of aperture outlets extending through the coating in flow communication with the channels for discharging the coolant.

Gupta et al. in figures 1-4, teaches a gas turbine component having a plurality of aperture outlets 18 extending through a coating 22 in flow communication with the channels 12 for discharging the coolant.

Since Sloop et al. as modified by Lee et al. and Gupta et al. are analogous art because they are from the same field of endeavor, that is the cooling in a gas turbine engine art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the shroud of Sloop et al. as modified by Lee et al. with the plurality of aperture outlets extending through the coating in flow communication with the channels for discharging the coolant as taught by Gupta et al. for the purpose of forming a cooling fluid film along the surface of the shroud exposed to the gas flow path.

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Claims 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sloop et al. (5,375,973) as modified by Lee et al. (6,617,003) as modified by Gupta et al. (5,941,686), as applied to claim 2 above, and further in view of Lee et al. (6,617,003).

Sloop et al. as modified by Lee et al. to claims 1 and 2 teach all the claimed subject matter except that they don't teach a bond coat laminated between said substrate wall and coating, and atop said flow channels.

Lee et al. in figure 4, teach a bond coat 22 laminated between said substrate wall 4 and coating 24, and atop said flow channels 20.

Since Sloop et al. as modified by Lee et al. and Lee et al. are analogous art because they are from the same field of endeavor, that is the thermal barrier coating for gas turbine engine art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the arrangement of Sloop et al. as modified by Lee et al. with the bond coat applied between the substrate and coating and atop flow channels as taught by Lee et al. for the purpose of preventing the separating of the thermal barrier coat from the substrate.

Claims 4-6, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sloop et al. (5,375,973) as modified by Lee et al. (6,617,003) as modified by Gupta et al. (5,941,686) in view of Hultgren et al. (5,098,257).

Sloop et al. as modified by Lee et al. as modified by Gupta et al. teach all the claimed subject matter except that they don't teach the network comprising inlet and outlet headers and a row of cross channels extending therebetween, the cross channels

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extend transversely between said inlet and outlet headers, and said cross channels are straight from said inlet header to said outlet header.

Hultgren et al. in figure 6(b), teach a cooling arrangement in a component of a gas turbine engine where a network of cooling channels comprises inlet 42 and outlet 43 headers and a row of cross channels 45 extending therebetween, the cross channels 45 extend transversely between said inlet 42 and outlet 43 headers, and said cross channels 45 are straight from said inlet header 42 to said outlet header 43.

Since Sloop et al. as modified by Lee et al. as modified by Gupta et al. and Hultgren et al. are analogous art because they are from the same field of endeavor, that is the cooling of a gas turbine engine art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the network of cooling channels of the shroud of Sloop et al. as modified by Lee et al. with the network comprising inlet and outlet headers and a row of cross channels extending therebetween, the cross channels extend transversely between said inlet and outlet headers, and said cross channels are straight from said inlet header to said outlet header as taught by Hultgren et al. for the purpose of reducing the backpressure losses in the cooling system of the gas turbine engine.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sloop et al. (5,375,973) as modified by Lee et al. (6,617,003) as modified by Gupta et al. (5,941,686) as modified by Hultgren et al. (5,098,257) as applied to claim 4 above, further in view of Lee et al. (6,617,003).

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Sloop et al. as modified by Lee et al. as modified by Gupta et al. as modified by Hultgren et al. teach all the claimed subject matter except that they don't teach the channels disposed in the bond coat below the coating and atop said substrate.

Lee et al. in figure 5, teaches a cooled component of a gas turbine engine having cooling channels 20 disposed in a bond coat 22 below a coating 24 and atop a substrate 4.

Since Sloop et al. as modified by Lee et al. as modified by Gupta et al. as modified by Hultgren et al. and Lee et al. are analogous art because they are from the same field of endeavor, that is the cooling of gas turbine engine art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the component of Sloop et al. as modified by Lee et al. as modified by Hultgren et al. with the channels disposed in the bond coat below the coating and atop said substrate as taught by Lee et al. for the purpose of reducing temperature of the bond coat.

Claims 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (6,617,003) in view of Gupta et al. (5,941,686).

Lee et al. teach all the claimed subject matter except that they don't teach a plurality of aperture outlets extending through the coating in flow communication with flow channels for discharging the coolant.



Gupta et al. in figures 1-4, teaches a turbine engine component having a plurality of aperture outlets 18 extending through the coating 22 in flow communication with flow channels 12 for discharging the coolant.

Since Lee et al. and Gupta et al. are analogous art because they are from the same field of endeavor, that is the gas turbine engine cooling art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the gas turbine engine wall of Lee et al. with the outlet apertures as taught by Gupta et al. for the purpose of forming a cooling fluid film along the surface of the shroud exposed to the gas flow path.

Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (6,617,003) as modified by Gupta et al. (5,941,686), further in view of Hultgren et al. (5,098,257).

Lee et al. as modified by Gupta et al. teaches all the claimed subject matter except that he doesn't teach the network comprising inlet and outlet headers and a row of cross channels extending therebetween, the cross channels extend transversely between said inlet and outlet headers, and said cross channels are straight from said inlet header to said outlet header.

Hultgren et al. in figure 6(b), teach a cooling arrangement in a component of a gas turbine engine where a network of cooling channels comprises inlet 42 and outlet 43 headers and a row of cross channels 45 extending therebetween, the cross channels

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45 extend transversely between said inlet 42 and outlet 43 headers, and said cross channels 45 are straight from said inlet header 42 to said outlet header 43.

Since Lee et al. as modified by Gupta et al. and Hultgren et al. are analogous art because they are from the same field of endeavor, that is the cooling of a gas turbine engine art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the network of cooling channels of the shroud of Sloop et al. as modified by Gupta et al. with the network comprising inlet and outlet headers and a row of cross channels extending therebetween, the cross channels extend transversely between said inlet and outlet headers, and said cross channels are straight from said inlet header to said outlet header as taught by Hultgren et al. for the purpose of reducing the backpressure losses in the cooling system of the gas turbine engine.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (6,617,003) as modified by Gupta et al. (5,941,686) as modified by Hultgren et al. (5,098,257), further in view of Sloop et al. (5,375,973).

Lee et al. as modified by Gupta et al. as modified by Hultgren et al. teach all the claimed subject matter except that they don't teach the an arcuate turbine shroud having forward and aft hooks extending outwardly from said substrate back surface for supporting said shroud above a row of rotor blades in a gas turbine engine.

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Sloop et al. in figures 1-7, teach an arcuate turbine shroud 19 having forward 21 and aft 22 hooks extending outwardly from a substrate back surface 40 for supporting said shroud 19 above a row of rotor blades 18 in a gas turbine engine.

Since Lee et al. as modified by Gupta et al. as modified by Hultgren et al. and Sloop et al. are analogous art because they are from the same field of endeavor, that is the gas turbine engine cooling art and because Gupta et al. in column 1, lines 15-20 teaches that cooling arrangement for components that include gas turbine engine shrouds, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to equip the wall of Lee et al. as modified by Gupta et al. as modified by Hultgren et al. with the arcuate front and back surfaces and forward and aft hooks extending outwardly from said substrate back surface for supporting said shroud above a row of rotor blades in a gas turbine engine. as taught by Sloop et al. for the purpose of utilizing the cooling arrangement of Lee et al. as modified by Gupta et al. as modified by Hultgren et al. for cooling the gas turbine engine shroud.

***Allowable Subject Matter***

Claims 7, 8, 20-22, and 24-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Prior Art***

Prior art made of record but not relied upon is considered pertinent to Applicant's disclosure and consist of one patent.

Guilbert et al. (4,679,981) is cited to show a cooled shroud for a gas turbine engine having a plurality of cooling channels disposed on a front surface of the shroud but fails to teach the TBC.

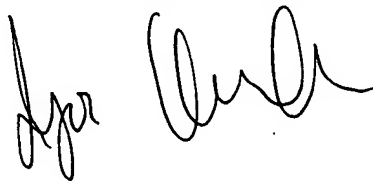
***Contact information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Kershteyn whose telephone number is **(571)272-4817**. The examiner can be reached on Monday-Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look, can be reached on **(571)272-4820**. The fax number is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308 0861.

IK  
December 3, 2004



**Igor Kershteyn  
Patent examiner.  
Art Unit 3745**



**EDWARD K. LOOK  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3700**

12/8/04